

137,757

PATENT



SPECIFICATION

Application Date, July 8, 1919. No. 17,121/19.

Complete Accepted, Jan. 22, 1920.

COMPLETE SPECIFICATION.

Improvements in or relating to Portable Drilling or like Apparatus.

(A communication from LIBERTY TOOL COMPANY, of 1318, Munsey Building, Baltimore, Maryland, United States of America.)

I, HAROLD WADE, of 111 & 112, Hatton Garden, London, E.C. 1, Chartered Patent Agent, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

- 5 This invention relates to portable drilling apparatus and more particularly to such as described and claimed in Specification No. 125,957 which apparatus embodies a drilling tool with operating means therefor, a holder therefor and a fluid pressure operated work clamp arranged opposite the drilling tool and adapted to clamp the work between itself and the tool.
- 10 In the specification above referred to the clamping means comprise a fluid-pressure-actuated piston arranged co-axially with the tool and the driver, which piston acts directly upon the work piece.
- Now the present invention is characterized by mounting the tool support and a frame member one upon the other for the movement of one relative to
- 15 the other, with a fluid pressure cylinder or cylinders connected with one of said parts, tool support or frame member, and containing a piston connected with the other, and a feed foot on the frame member for presenting and feeding the work piece and tool relative to each other when fluid pressure is introduced into the cylinder. An adjustable stop is mounted on the frame
- 20 member to limit the relative movement of the tool and work piece, and a clamp member is also mounted on the frame bar adjustable to hold the work piece.

The invention is characterized by other features hereinafter described.

In the accompanying drawings:

- 25 Figure 1 is a side view.
Figure 2 is a sectional view on the line 2—2 of Figure 1.
Figure 3 is a sectional view on the line 3—3 of Figure 1.
Figure 4 is an end view.
Figure 5 is an end view looking from the left of Figure 1.
30 Figure 6 is a horizontal sectional view substantially on the line 6—6 on Figure 1.
Figure 7 is a view of modified form of apparatus.
Figure 8 is a side view of a further modification.
Figure 9 is an end view of modification shown in Figure 8; and
35 Figure 10 is a modified form of feed foot.

In these drawings 1 is the tool driven by a motor indicated by the dotted line at *b*. The power may be fluid, pneumatic, electric or liquid. This motor is supported upon a bolt *c*, the said bolt having a hand wheel *d*. It is

[Price 6d.]

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mounted in the arm e of a frame extending at one side of the axis of the motor. This frame or tool support has an adjustable arm e^1 which can be set at different points, for which purpose a dove-tail track portion is employed at f , which receives a correspondingly formed lower portion of the arm e^1 . A clamping bolt g is adapted to fix the arm e^1 . The arm e^1 has an opening e^{11} 5 to receive a boss h of the motor casing. The tool supporting bracket is mounted upon a carrying bar i with which it has sliding engagement, so that one of these parts, bar and tool carrier frame, may move relatively one to the other. The tool carrier or frame is formed with cylinders k, k^1 , which are located on opposite sides of the main frame bar i . These cylinders contain 10 pistons k^1, k^1 , the rods l of which extend through the heads of the cylinders at l^1 . The outer ends of the said piston rods are connected together by a yoke m and nuts m^1 . This yoke has an opening at its central portion as at n , which receives the main frame member i and means are provided whereby this yoke may be fixed to the frame bar i at different points along the same, 15 which consists of a bolt o having its side face at o^1 corresponding in curved shape to the side of the frame bar. A nut o^{11} operated by a handle o^2 will effect the drawing up of the bolt into clamping position. The bar i has mounted thereon a feed foot, p , having an opening to receive the feed bar i . The shank end of this foot member is split and receives a cross bolt p^1 operated 20 by a handle p^{11} to draw the split portion p^2 together, so as to clamp the member on the bar i . The upper end of the member p may be forked so that the drill may pass between the arms of this fork in case the drilling operation carries the drill entirely through the work-piece.

The member p may be formed in two pieces as shown, the upper piece 25 having the fork at p^3 and the lower piece being slotted at p^4 so that the member p^3 can be adjusted vertically, a bolt p^5 being employed to clamp the fork p^3 to the lower portion of this member. A work clamp q is also mounted on the holding or feed bar i and is provided with a clamping member q^1 by which the work clamp can be set at different points along the bar i and a 30 stop r is also mounted on the bar i to be set in different positions as may be desired by a set bolt r^{11} . The work piece is indicated at r^1 and this is representative of any member which is to be drilled, countersunk, or reamed.

The work-piece is clamped between the member p and the work clamp q and then by introducing the motive power into the cylinders relative movement 35 will ensue between the feed bar i with the work piece and the cylinders with the tool bracket carrying the motor and the tool so that the work piece and tool will be brought together for the operation to be performed on the work-piece.

It will be noted that the cylinder and piston instead of being located at 40 the end of the apparatus and axially in line with the tool to act directly on the work piece is located offset from the axis of the motor and tool and above the point where the work is to be performed, or in other words on the same side of the work-piece that the motor and tool are located and the work-piece 45 instead of being located between the piston and the tool is located between a feed foot p and the tool, this foot being rendered effective by the relative movement of the tool carrier and bar i . This feeding foot p is of small dimensions and it occupies little space in the direction of the axis of the tool, and there are many situations where this foot can reach between a flange and 50 an adjacent member thus giving the apparatus a wide range of use.

It will be observed that by setting stop r^1 at different points along the bar i the extent of movement of the tool and work piece relative to each other may be limited to get the desired depth of cut or the tool can be permitted to 55 pass through the work piece completely if desired. The stop r^1 arrests the relative movement of the feed bar i , with the work piece and the main tool or bracket with the tool by coming against the end of the bracket.

Means for ejecting the tool from its socket in the motor, consists of a screw

threaded bar *s* operated by a handle *s*¹ and having an extension *s*¹¹ with a rod *s*³ to bear on the shank of the tool.

Suitable handles are indicated in dotted lines at *t*.

The feed foot may be of the form shown in Figure 10, *i.e.* generally of U-shape with one side extended, and this may support the forked member like *p*³.

The fluid pressure is introduced through a pipe *u*, controlled by a valve *v* operated by a handle *c*¹ and a bleed nipple *w* is employed to allow the pressure to bleed out from the cylinder back of the piston. Openings are formed through the cylinder heads to prevent the formation of an air cushion against which the piston would have to work.

In the modification, Figure 7, cylinder *k*³ is clamped adjustably to the carrying rod. The piston *k*⁴ is connected by its piston rod *k*⁵ with the frame *e*³ in which the motor is supported, this frame having a hinged arm *c*⁴ for supporting one end of the motor casing. This arm is held in position by a hinged bolt *e*⁵.

The fluid may be introduced into the cylinder by making the piston rod with a conduit *k*⁶, the inlet for the fluid is indicated at *k*⁷.

In Figure 8 a single cylinder and piston is shown. The cylinder is formed with or attached to the tool carrying bracket and forms the base of said bracket. It has a stuffing box 10.

The piston has within it a split collar 11 surrounding the cylindrical frame bar *i*, a wedge member 12 is adapted to spread the split collar and thus bind itself together with the piston to the frame bar *i*.

For operating the wedge a cup-shaped nut 13 is used. This nut is turned by a key 14. This key is permanently carried by the cylinder wall but normally it is pressed by a spring 15 out of connection with the nut, so that the piston with its piston rod *i.e.* the main frame bar will be free to be moved in the cylinder.

The key has a conical valve portion 16 to be pressed on the seat 17 in the wall of the cylinder to prevent the escape of air. An external handle is shown at 18.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, as communicated to me by my foreign correspondents, I declare that what I claim is:—

1. A portable drilling or like apparatus employing fluid pressure for effecting relative movement between the tool and the work piece characterized by mounting the tool support and a frame member one upon the other for the movement of one relative to the other, with a fluid pressure cylinder or cylinders connected with one, containing a piston or pistons connected with the other, and a feed foot connected with the frame member for presenting the work piece to the tool.

2. In connection with the features of Claim 1, the frame member in the form of a bar extending slidably through the tool support or through the cylinder forming a part of said support.

3. In connection with the features of Claims 1 and 2, a stop adjustably mounted on the frame bar to contact with the tool support and arrest the relative movement of the bar and tool support for determining the depth of cut of the tool.

4. In connection with the features of Claims 1 and 2, a clamp member mounted on the frame bar in front of the feed foot, substantially as described.

5. In connection with the features of Claim 1, the tool and motor support in the form of a bracket having an arm in which one end of the motor casing is mounted and an adjustable arm in which the other end of said casing is mounted, substantially as described.

6. In connection with the features of Claim 1, carrying the cylinder as a

part of or connected to the tool support as a base therefor, and the piston carried by or connected to the frame member, substantially as described.

7. In connection with the features of Claim 1, the pair of cylinders one on each side of the frame member or bar having the pistons connected with the bar.

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8. In connection with the features of Claim 1, means for adjustably setting the tool support with the cylinder and piston at different points along the frame bar, substantially as described.

9. The portable drilling apparatus constructed according to Figures 1 to 6.

10. The portable drilling apparatus constructed according to Figure 7.

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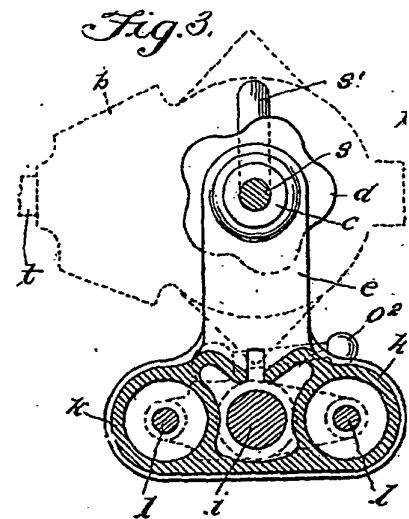
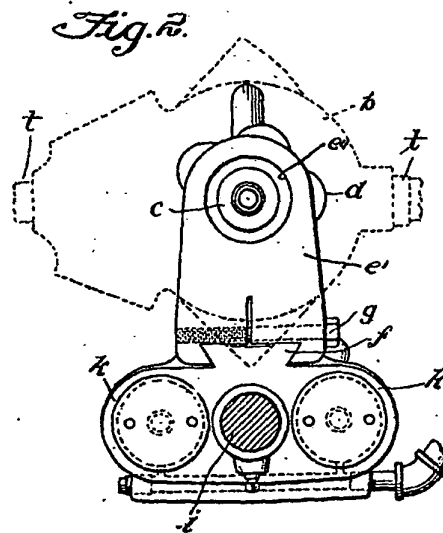
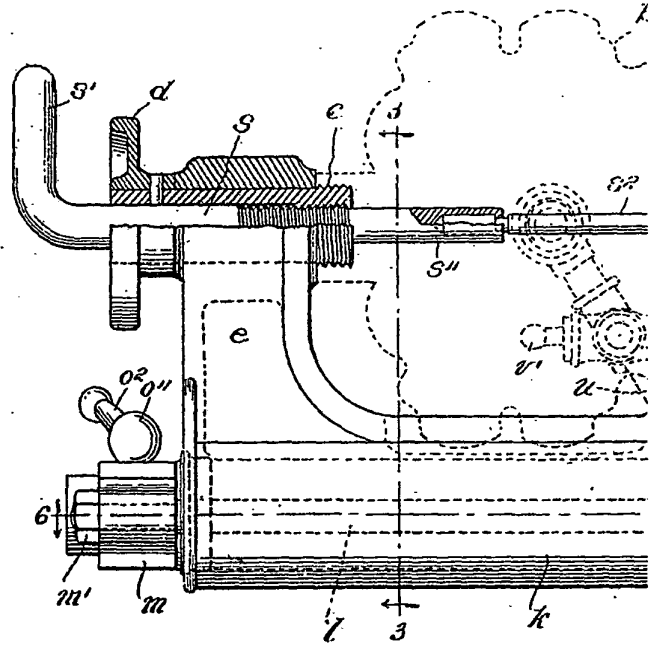
11. The portable drilling apparatus constructed according to Figure 8.

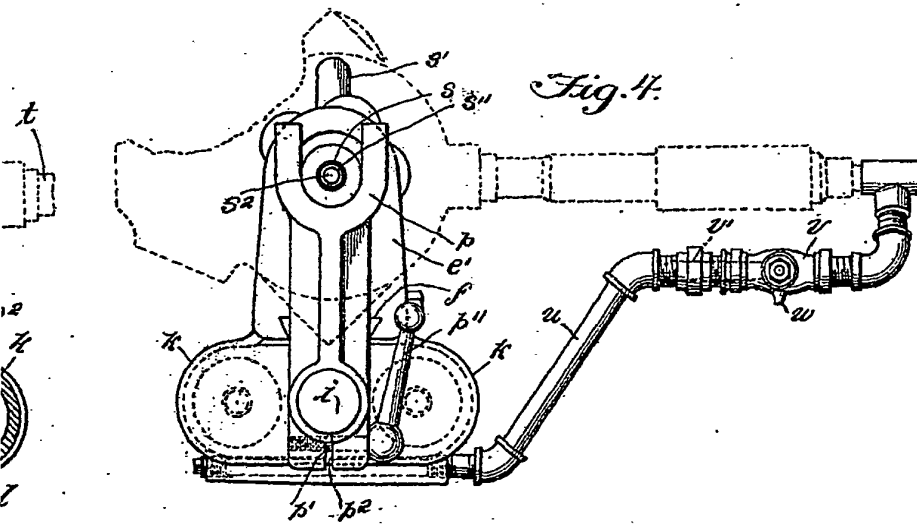
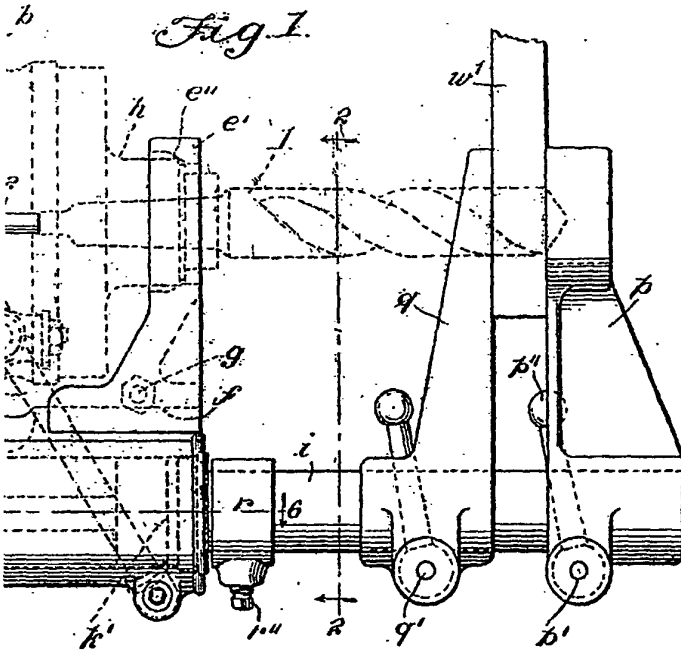
Dated this 8th day of July, 1919.

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137,751. WADES COMPLETE SPECIFICATION

(14 SHEETS)
SHEET 1

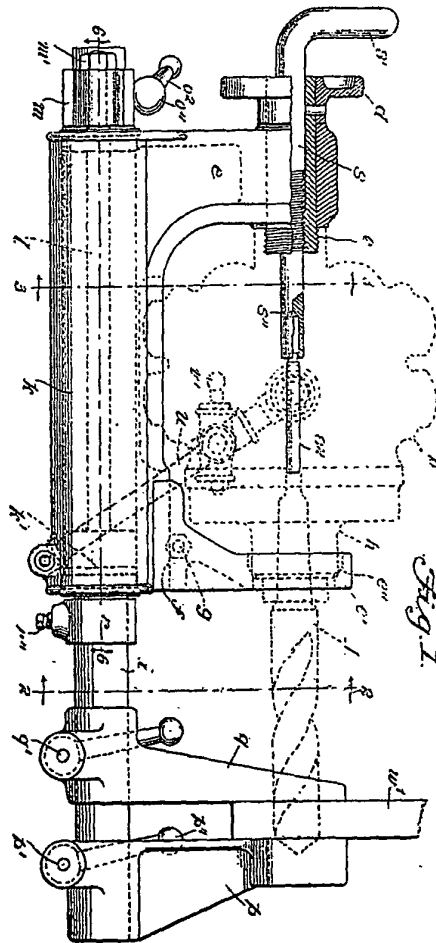


Fig. 1.

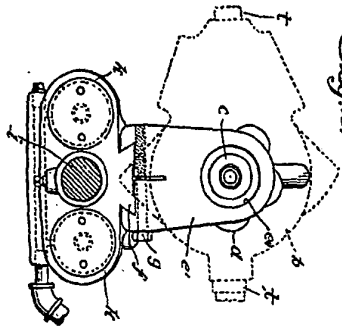


Fig. 2.

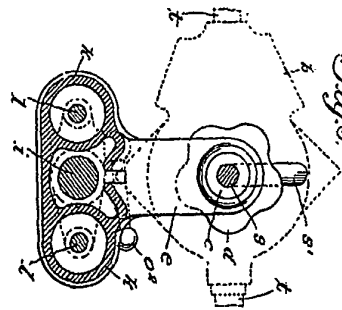
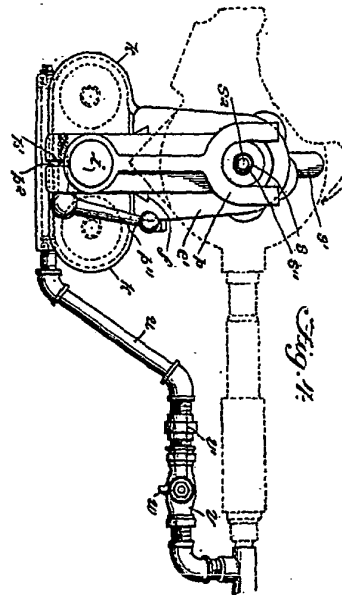
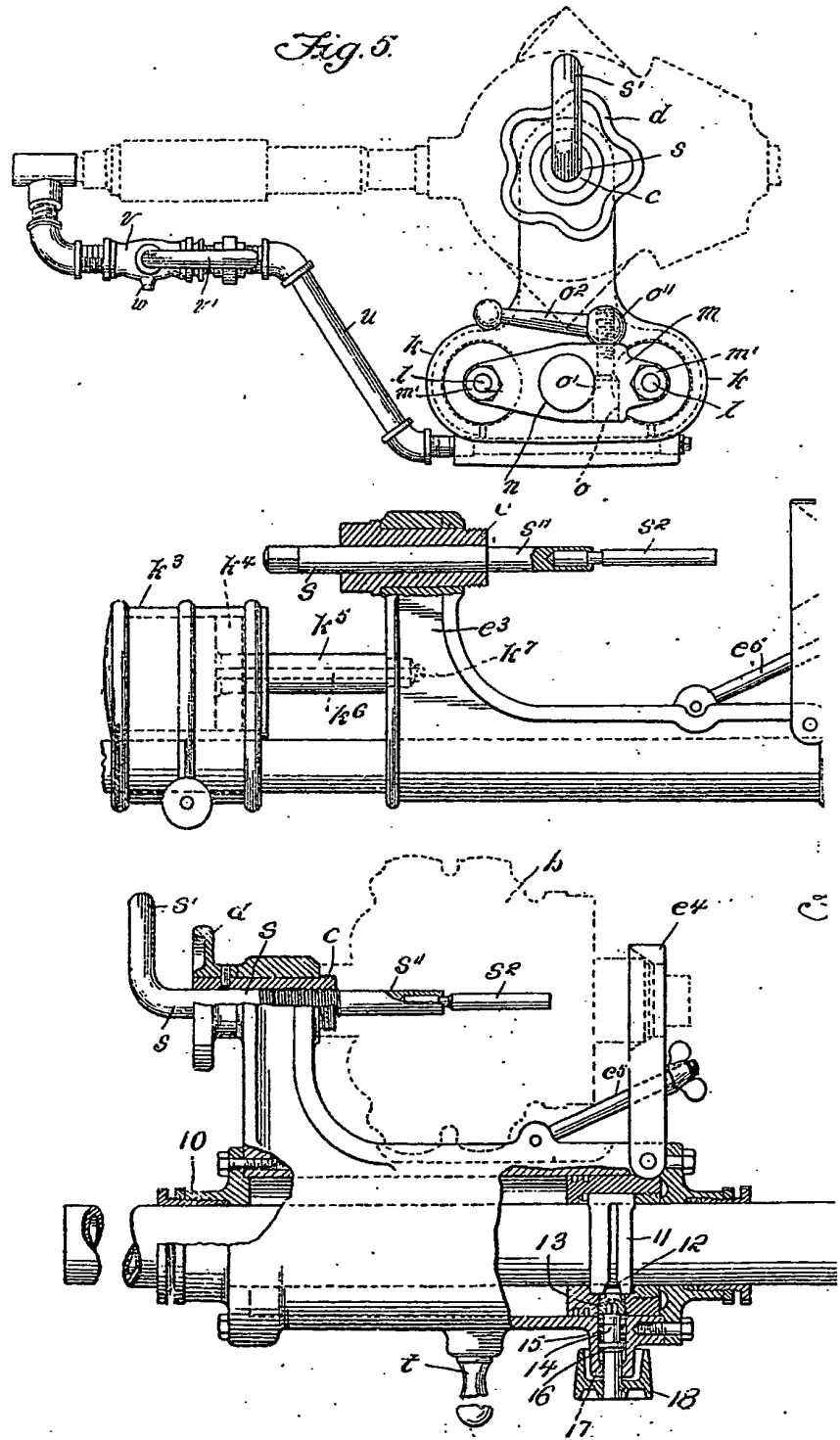
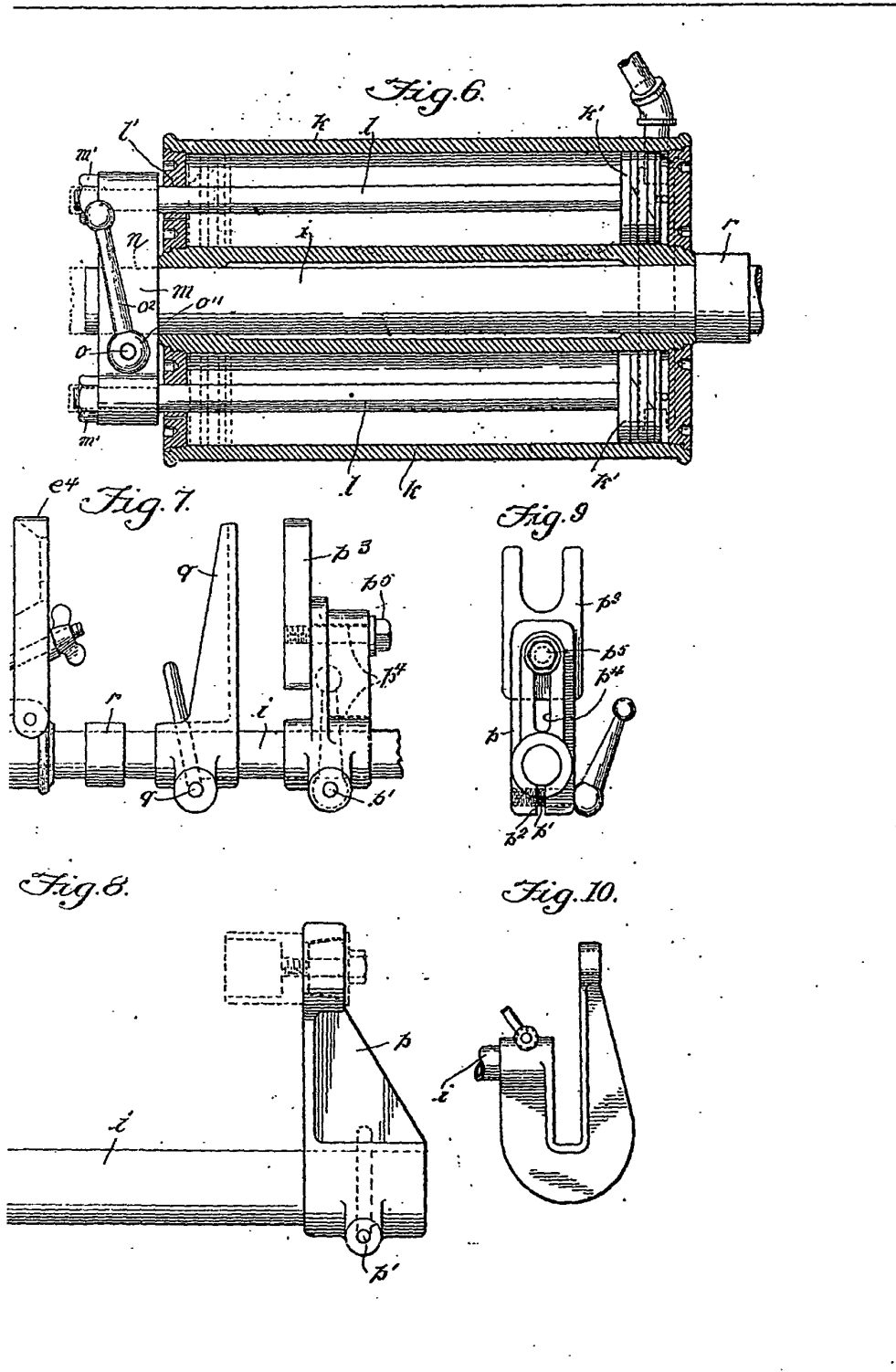


Fig. 3.



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